

*BS*  
1011. (Amended) The sensor of claim 1, wherein said gate electrode disposed above said top surface electrode is separated from said top surface electrode only by said conducting material.

*BY*  
11. (Amended) The method of manufacturing a sensor of claim 4, wherein said gate electrode disposed above said top surface electrode is separated from said top surface electrode only by said conductive material.

Please add new claims 14 and 15 as follows:

*BS*  
12-14. (New) The sensor of claim 1, wherein said surface of said gate electrode disposed above said top surface electrode does not cover the entire surface of the top surface electrode.

*B*  
15. (New) The method of manufacturing a sensor of claim 4, wherein said surface of said gate electrode disposed above said top surface electrode does not cover the entire surface of the top surface electrode.--

## REMARKS

### I. Introduction

In response to the pending Office Action, Applicants have amended claims 1 and 4 so as to further clarify the subject matter of the present invention. Specifically, claims 1 and 4 have been amended to recite that the gate electrode is formed directly above the resistive element as is shown, for example, in Fig. 1. Claims 11 and 13 have been amended to change the dependency of the claims. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that the pending claims are patentable over the cited prior art references.

**II. The Rejection Of The Claims Under 35 U.S.C. § 102**

Claims 1, 2, 4 and 10-13 were rejected as being anticipated by USP No. 5,352,895 to Inoue. Applicants respectfully submit that the pending claims are patentable over Inoue for the following reasons.

Referring to Fig. 1 of the Applicants' specification, in the claimed device (and the method of forming the device), the gate electrode 6 is disposed above the top surface electrode 4 of the resistive element 2 in a "stacked" formation. In addition, the gate electrode 6 is only separated from the top surface electrode 4 of the resistive element 2 by the conductive layer 10 (see, claims 11 and 13). Furthermore, the gate electrode is such that it does not cover the entire surface of the top surface electrode 4 (see, new claims 14 and 15).

As a result of the foregoing structure, the present invention allows for a reduction in the overall size of the device, elimination of a mounting board (which in the prior art was utilized to support the FET) and a reduction in the number of wires necessary for wiring the circuit. Thus, the structure of the present invention significantly reduces the material cost, the time associated with assembling the device and the overall size of the device.

Turning to the cited prior art, Inoue does not disclose or suggest any specific structure or formation of the device, much less the "stacked" formation of the present invention detailed above. Inoue simply discloses a schematic diagram of a pyroelectric

device having a gate electrode coupled to a resistive element and a pyroelectric member 1. However, as stated, there is no disclosure how these elements are positioned or formed relative to one another. As such, Inoue discloses even less than the admitted prior art illustrated in Fig. 6 of the Applicants' specification. Indeed, the device of Inoue could be fabricated in the same manner, and would therefore suffer from the same problems solved by the present invention.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), for the foregoing reasons, it is clear that Inoue does not anticipate either claim 1 or claim 4, or any claim dependent thereon.

### **III. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable**

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1 and 4 are patentable for the reasons set forth above, it is respectfully submitted that all dependent claims are also in condition for allowance.

**IV. Request For Notice Of Allowance**

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

Respectfully submitted,

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

Claims 10 and 12 have been cancelled, without prejudice.

Claims 1, 4, 11 and 13 have been amended and new claims 14-15 have been added as follows:

1. (Twice Amended) A sensor including:

a resistive element having a top surface electrode and a bottom surface electrode;

a sensing element for sensing energy from outside and generating an electrical signal;

a field effect transistor element in which a gate electrode is formed on a rear surface of a chip containing said field effect transistor element; and

a substrate having a first electrode, a second electrode, and a third electrode on the top surface of said substrate;

wherein:

the bottom surface electrode of said resistive element is electrically connected with the first electrode of said substrate;

the gate electrode of said field effect transistor element is disposed above the top surface electrode of the resistive element, said gate electrode being electrically connected with the top surface electrode of the resistive element by a conductive material [is electrically connected to a portion of the top surface electrode of said resistive element by a conductive material];

one of the electrodes of said sensor element is electrically connected with a portion of the top surface electrode of said resistive element;

a source electrode and a drain electrode of said field effect transistor element are respectively electrically connected with the second electrode and the third electrode on said substrate; and

the other electrode of said sensing element is electrically connected with the first electrode on said substrate.

4. (Twice Amended) A method of manufacturing a sensor, said sensor including:
  - a resistive element having a top surface electrode and a bottom surface electrode;
  - a sensing element for sensing energy from outside and generating an electrical signal;
  - a field effect transistor element on which a gate electrode is formed on [the] a rear surface of a chip containing said field effect transistor element; and
  - a substrate having a first electrode, a second electrode, and a third electrode on the top surface of said substrate;
- said method comprising the steps of:
  - electrically connecting the bottom surface electrode of said resistive element with the first electrode of said substrate;
  - electrically connecting the gate electrode of said field effect transistor element to a portion of the top surface electrode of said resistive element by a conductive material, said gate electrode being disposed above the top surface electrode of the resistive

element, said gate electrode being separated from the top surface electrode of the resistive element by the conductive material;

electrically connecting one of the electrodes of said sensing element with a portion of the top surface electrode of said resistive element;

electrically connecting a source electrode and a drain electrode of said field effect transistor element with the second electrode and the third electrode on said substrate, respectively; and

electrically connecting the other electrode of said sensing element with the first electrode on said substrate.

11. (Amended) The sensor of claim [10] 1, wherein said [surface of said] gate electrode disposed above said [portion of the] top surface electrode is separated from said [portion of the] top surface electrode only by said conducting material.

13. (Amended) The method of manufacturing a sensor of claim [12] 4, wherein said [surface of said] gate electrode disposed above said [portion of the] top surface electrode is separated from said [portion of the] top surface electrode only by said conductive material.

Please add new claims 14 and 15 as follows:

--14. (New) The sensor of claim 1, wherein said surface of said gate electrode disposed above said top surface electrode does not cover the entire surface of the top surface electrode.



15. (New) The method of manufacturing a sensor of claim 4, wherein said surface of said gate electrode disposed above said top surface electrode does not cover the entire surface of the top surface electrode.--